MAFS.7.RP.1.1

A CALCULATOR IS ALLOWED

Juan learned that gear ratio refers to the number of times one gear rotates in relation to another gear. The ratio of the gears in the picture below is $1\frac{1}{2}$ to $\frac{1}{2}$.

1. Write two **unit** rates to represent the gear ratio above.
(Numbers can be used more than once.)

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{3}{2}$ 1 $1\frac{1}{2}$ 3	$\square : \square$ $\square : \square$

2. Explain what each unit rate means in the context of the problem.

3. A machine packs boxes at a constant rate of $\frac{2}{3}$ of a box every $\frac{1}{2}$ minute.

What is the number of boxes per minute that the machine packs?

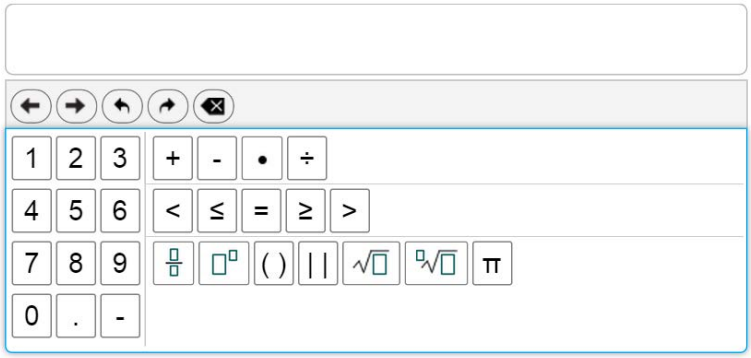
Ⓐ $\frac{1}{3}$

Ⓑ $\frac{3}{4}$

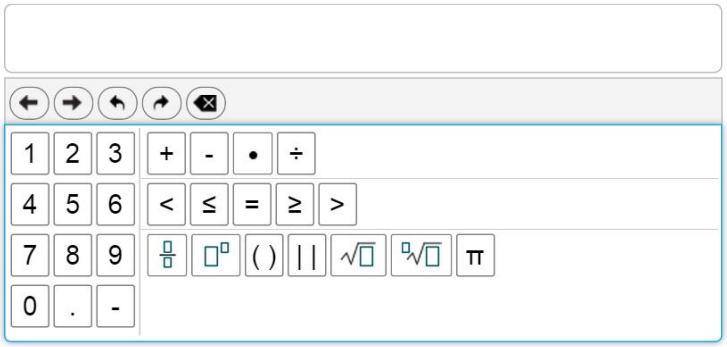
Ⓒ $1\frac{1}{6}$

Ⓓ $1\frac{1}{3}$

4. A. The fountain in the pond behind Kevin's school has a pump that recirculates 60 gallons of water every $\frac{1}{5}$ of an hour. Express this rate as a **unit** rate in gallons per hour.



B. The fountain in the pond at the public park near Kevin's house has a pump that recirculates 75 gallons of water in $\frac{1}{4}$ of an hour. Express this rate as a **unit** rate in gallons per hour.



C. Which fountain flows at a faster rate? Explain.

MAFS.7.RP.1.2

A CALCULATOR IS ALLOWED

1. Select each option that represents a proportional relationship between x and y.

Ⓐ

x	y
$1\frac{1}{2}$	6
$3\frac{1}{4}$	13
7	28

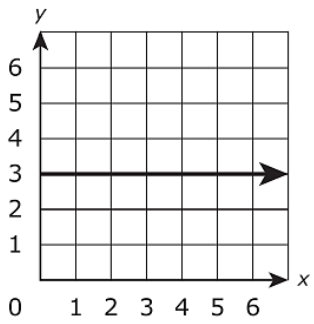
Ⓑ

x	y
4	1
5	2
9	6

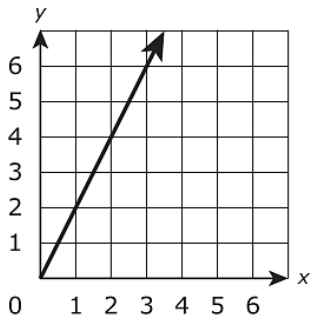
Ⓒ $y = \frac{7}{8}x$

Ⓓ $y = x + 1$

Ⓔ



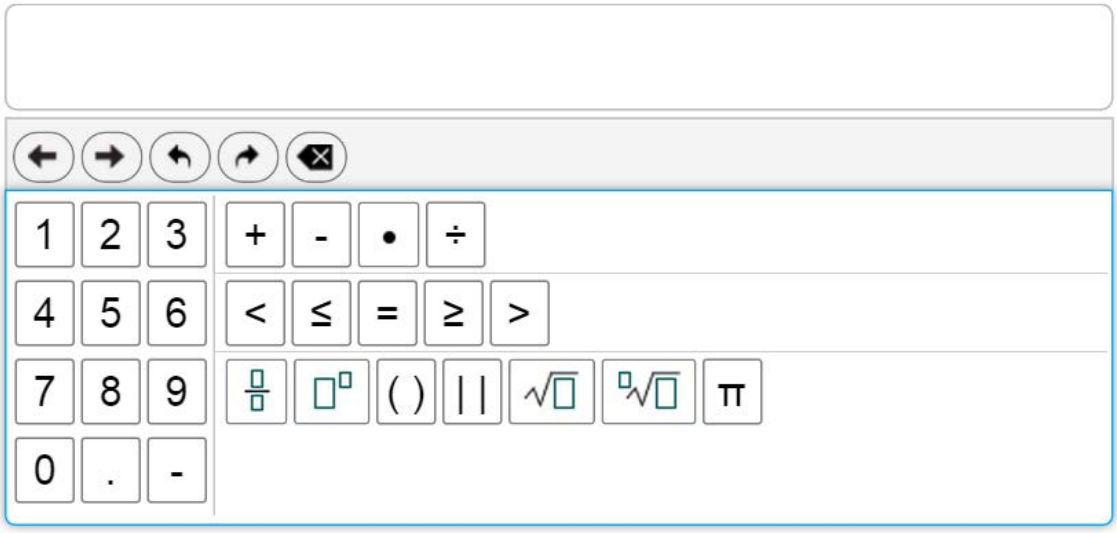
Ⓕ



3. This table shows a proportional relationship between x and y.

x	y
2	1.25
4	2.5
6	3.75
10	6.25

What is the constant of proportionality between x and y?
(as a decimal.)



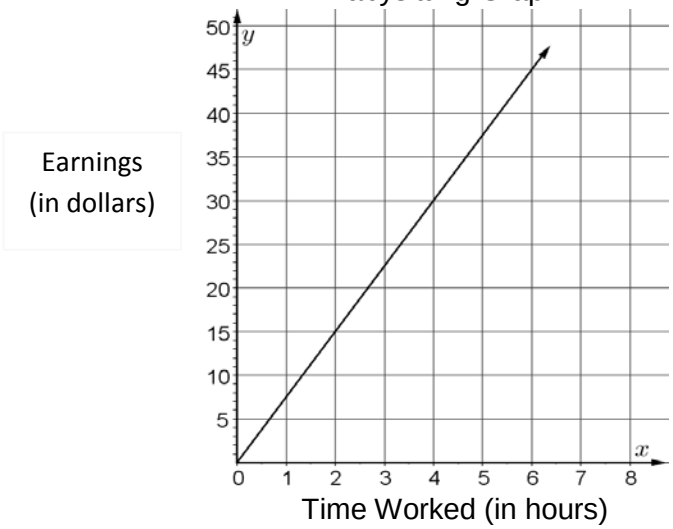
4. Hayden mixed 6 cups of blue paint with 8 cups of yellow paint to make green paint. To represent the relationship between the number of cups of blue paint, b, and the number of cups of yellow paint, y, needed to make the same shade of green paint, Hayden wrote the equation $b = \square y$.

What number should be placed in the box?

8 0.75 6 1.33	$b = \square\, y$

5. The amount Sandy earns from babysitting is proportional to the number of hours she works. The graph represents this proportional relationship.

Babysitting Graph



A. Explain what the point (0, 0) represents in the context of this problem.
Write your answer in the space provided.

B. Explain what the point (6, 45) represents in the context of this problem.
Write your answer in the space provided.

C. Find the hourly rate that Sandy charges and write this as an ordered pair.
Write your answer in the space provided.

3. Tiffany plans to use $275 she earned from a summer job to buy some new clothes for school. She found several items she likes but is trying to decide if she has enough money to buy all of them. She wants to buy three pairs of jeans for $42 each and five shirts with an average cost of $27 per shirt. She will have to pay $6\frac{1}{2}$ % sales tax.

   A. If she buys all of these items, how much tax will she have to pay?

   B. Will she have enough money for the entire purchase? Explain how you know whether she will have enough money.
   Write your answer in the space provided.

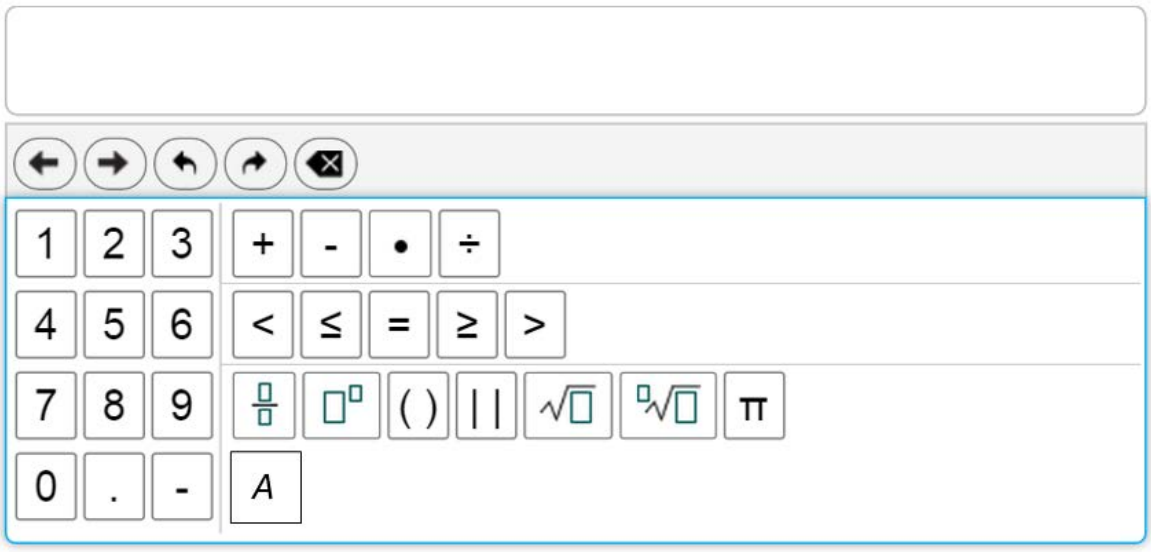
4. Today, gasoline prices are $3.44 per gallon. One year ago, gasoline prices were $3.75 per gallon. Determine the percent of change in the gasoline price from a year ago to today. Show how you calculated this change and interpret its meaning in the context of this problem.
Write your answer in the space provided.

5. Kennedy wants to use an internet site to sell his game system. The website will charge him a fee that will be deducted from the selling price.

   A. Suppose the fee is $9\frac{1}{2}\%$ of the selling price. Determine the amount of the fee if Kennedy sells his system for $50.

   B. How much money will Kennedy receive after the fee has been deducted?

6.	A \$1,500 loan has an annual interest rate of $4\frac{1}{4}\%$ on the amount borrowed. How much time has elapsed if the interest is now \$127.50?

	Part B During a clearance sale, Alexandra discounts the Halloween sweatshirts by 55%. What is the percentage of profit Alexandra will make on each Halloween sweatshirt she sells? Show your work or explain your answer.
6.	Write an equation to find the amount of simple interest, A, earned on a $**600** investment after $1\frac{1}{2}$ years if the interest rate is **2**%. 

MAFS.7.EE.1.1

A CALCULATOR IS ALLOWED

1. Which expressions are equivalent to $-2.5(1 - 2n) - 1.5n$?

   Select **all** that apply.

   Ⓐ $-2.5 - 3.5n$

   Ⓑ $-2.5 + 3.5n$

   Ⓒ $-2.5 - 6.5n$

   Ⓓ $-2.5 - n(5 - 1.5)$

   Ⓔ $-2.5 + n(5 - 1.5)$

2. Mark which expressions are equivalent to 8 – 2(5x – 3).
   Explain or show work to justify your decision.

Expression	Equivalent
A. $6(5x - 3)$	☐
B. $8 - 10x + 6$	☐
C. $8 - (10x - 6)$	☐
D. $8 - 10x - 6$	☐
E. $-10x + 14$	☐

Explanation

3. Which expressions are a factor of $-48xyz - 24xy + 40xyz$?

   Select **all** that apply.

   Ⓐ 4

   Ⓑ 24

   Ⓒ $3x$

   Ⓓ $8y$

   Ⓔ $2xy$

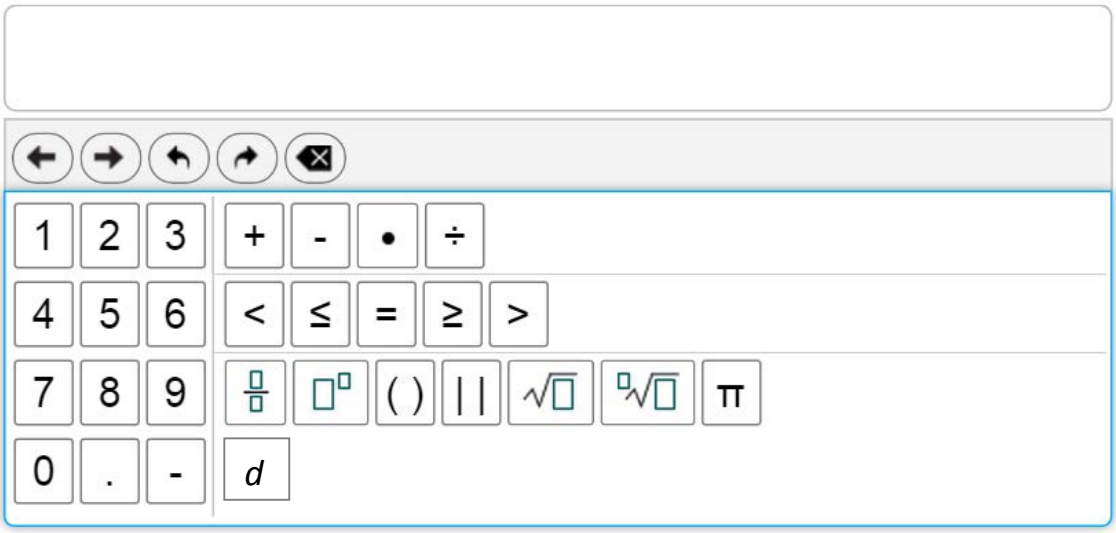
   Ⓕ $6xy$

   Ⓖ xyz

4.	At the beginning of the month, Alexa's bank account contained $4329.97. She then made two deposits of $452.28 each and a withdrawal of $279.34. Alexa estimates that she has about $5000 in her account. Use a mental strategy to determine if her estimate is reasonable. Explain and describe your strategy. Write your answer in the space provided.
5.	Bruno noticed today's gasoline price at the local convenience store was advertised as $3.40 per gallon. This price is 15% above last year's price. Calculate last year's price, showing each step of your work.

4. A scrapyard had 200 tons of recycled steel. They sold 15 tons per day for several days. If there are fewer than 80 tons left at the scrapyard, how many days, *d*, have passed?

A. Write an inequality to answer the question.

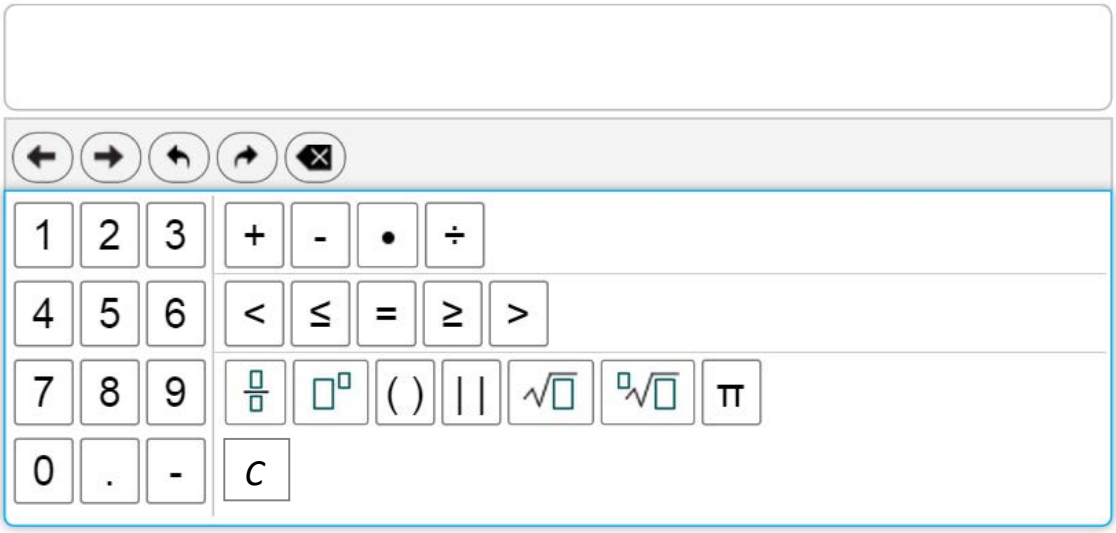


B. Solve the inequality.

C. Graph the solution set of the inequality. What does the solution of your inequality mean in terms of the answer to the question?

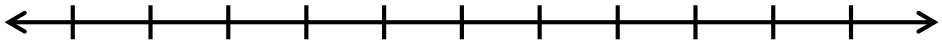
5. When carbon dioxide is frozen, it is called dry ice. In order to keep the carbon dioxide frozen, the temperature has to be $-109.3°$ Fahrenheit or lower. Fahrenheit is $\frac{9}{5}$ of the Celsius temperature plus 32 degrees.

A. Write an inequality to determine the Celsius temperatures, *C*, at which dry ice can be kept.

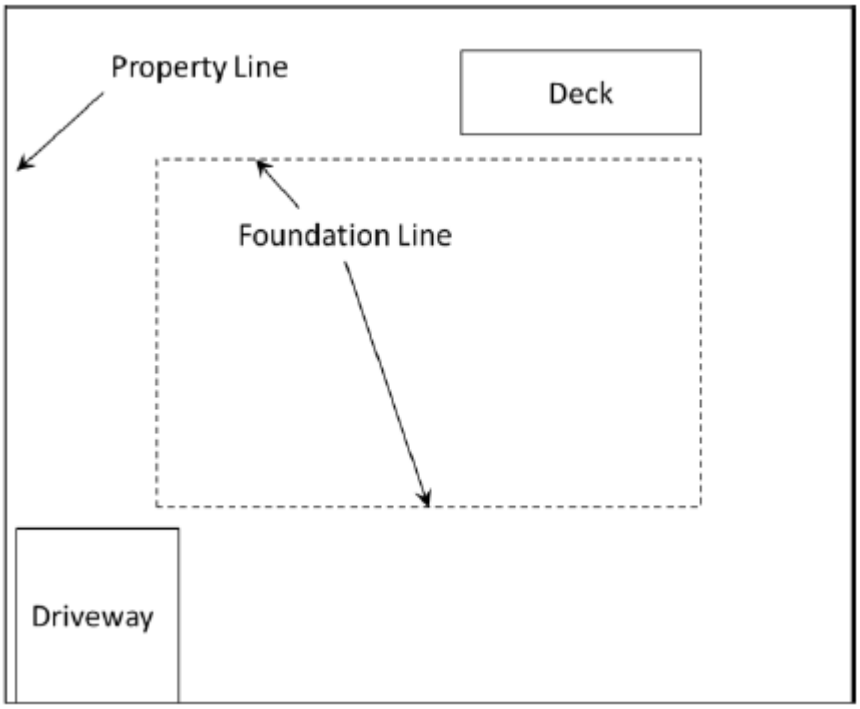


B. Solve your inequality.

C. Scale the number line below and graph the solution to the inequality.



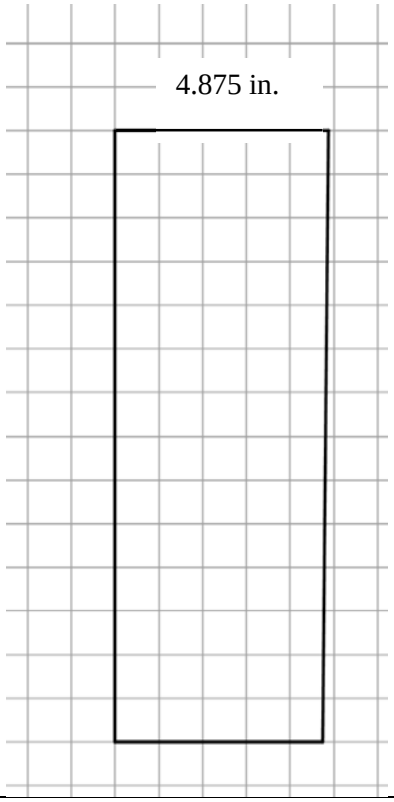
5. Over the break, your uncle and aunt ask you to help them cement the foundation of their newly purchased land and give you a top-view blueprint of the area and proposed layout. A small legend on the corner states that 4 inches of the length corresponds to an actual length of 52 feet.



A. What is the scale factor?

B. If the dimensions of the foundation on the blueprint are 11 inches by 13 inches. What are the actual dimensions in feet?

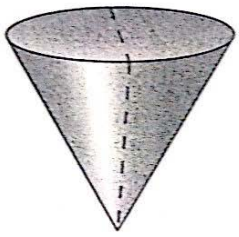
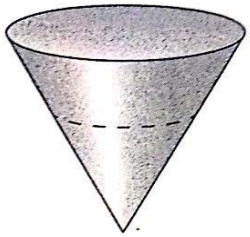
C. You're asked to go buy bags of dry cement and know that one bag covers 350 square feet. How many bags do you need to buy to finish this project?

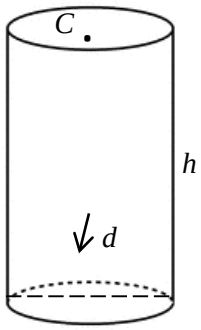
	MAFS.7.G.1.1-FSA Practice	 A CALCULATOR IS ALLOWED
1.	Racquel drew a picture of her school. She used the scale 1 cm : 3 m. Her drawing is 61 cm long. What is the length, in meters, of the actual school?	
2.	Each solar array wing on the International Space Station measures 39 feet by 112 feet. The scale drawing of a solar array wing shown below was made using a scale of 1 inch: 8 feet.  Write the ratio of the area of the wing in the drawing (square inches) to the area of an actual solar array wing (square feet) as a unit fraction.	
3.	Explain the relationship between your answer to Question 2 and the scale of the drawing.	

5. Determine if each set of lengths can be used to construct a triangle. If not, explain why not.

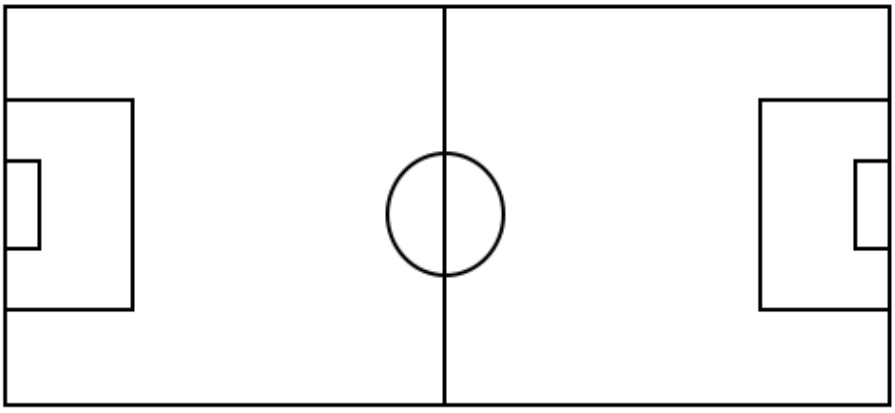
Side Lengths	Yes	No	Explanation
A. 5 cm, 8 cm, 12 cm	☐	☐	
B. 12 in., 12 in., 12 in.	☐	☐	
C. 3 ft, 6 ft, 10 ft	☐	☐	

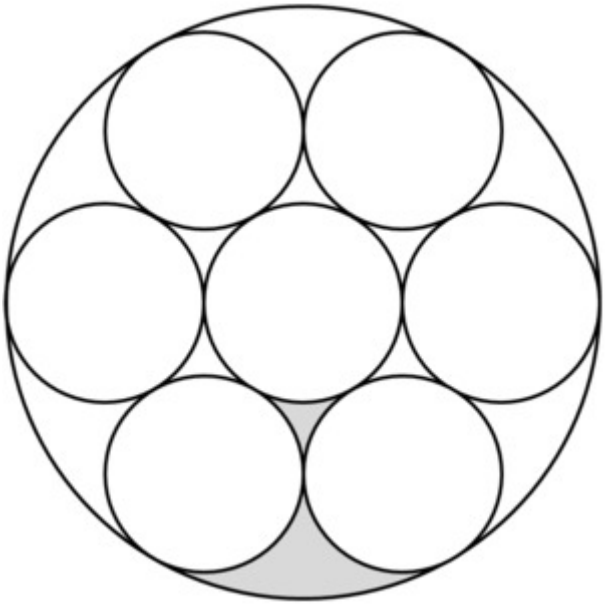
In general, what must be true of three lengths in order for them to construct a triangle?

	MAFS.7.G.1.3	**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Misha has a cube and a right square pyramid that are made of clay. She placed both clay figures on a flat surface. Misha will make slices through each figure that are parallel and perpendicular to the flat surface. Which statements are true about the two-dimensional plane sections that **could** result from one of these slices? Select **all** that apply. Ⓐ A plane section that is triangular could result from one of these slices through the cube. Ⓑ A plane section that is square could result from one of these slices through the cube. Ⓒ A plane section that is rectangular but not square could result from one of these slices through the cube. Ⓓ A plane section that is triangular could result from one of these slices through the pyramid. Ⓔ A plane section that is square could result from one of these slices through the pyramid. Ⓕ A plane section that is rectangular but not square could result from one of these slices through the pyramid.	
2.	What two-dimensional shapes appear if you slice a cone as shown on each figure?  Vertical cut  Horizontal cut Write your answer in the space provided.	

4.	Use the cylinder with height, *h=7 units*, center of base, *C*, and diameter, *d= 4 units*, to answer the following questions: Describe the two-dimensional plane figure that results from making a horizontal slice, parallel to the base and how the dimensions of the cross-section compare to the dimensions of the cylinder.  Write your answer in the space provided.

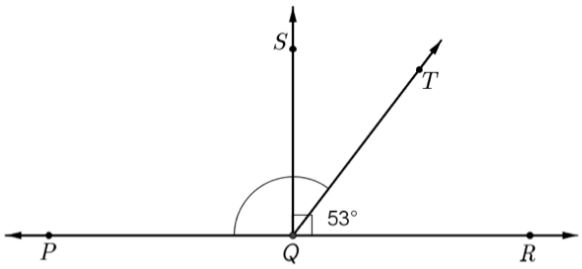
	MAFS.7.G.2.4	 **A CALCULATOR IS ALLOWED**
1.	Use the information provided to answer Part A and Part B. A circular mirror has a diameter of 12 inches. **Part A** What is the area, in square inches, of the mirror? Ⓐ 6π Ⓑ 12π Ⓒ 36π Ⓓ 72π **Part B** A circular frame that is 3-inches wide surrounds the mirror. What is the combined area, in square inches, of the circular mirror and the frame? Ⓐ 9π Ⓑ 18π Ⓒ 54π Ⓓ 81π	
2.	A. State the formula(s) for finding the circumference of a circle. Write each answer on a separate line. 1 2 3 + - • ÷ 4 5 6 < ≤ = ≥ > 7 8 9 ( ) | | π 0 . - C d r B. Explain what each symbol in the formula represents.	

4.	The center circle of a soccer field prohibits a defender from being near the ball at the start or restart of a soccer game. On a professional soccer field this circle is 20 yards in diameter. Find the area of this circle. Show work or explain how you found your answer. 

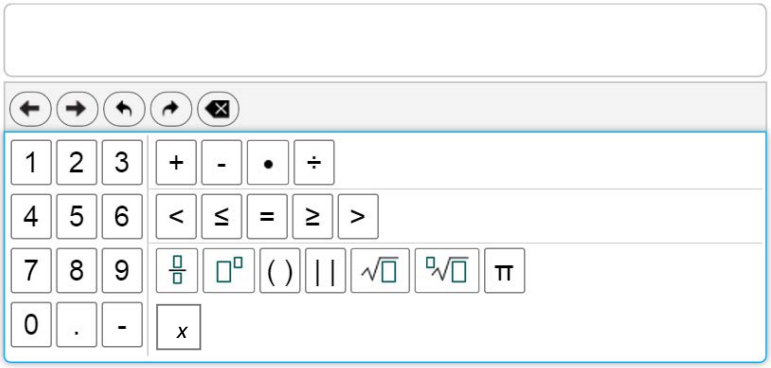
	MAFS.7.G.2.4-FSA Practice	 **A CALCULATOR IS ALLOWED**
	The figure below is composed of eight circles, seven small circles and one large circle containing them all. Neighboring circles only share one point, and two regions between the smaller circles have been shaded. Each small circle has a radius of 5 cm. 	
1.	Calculate the area of the large circle.	
2.	Calculate the area of the shaded part of the figure.	

	MAFS.7.G.2.5	 A CALCULATOR IS ALLOWED

1.



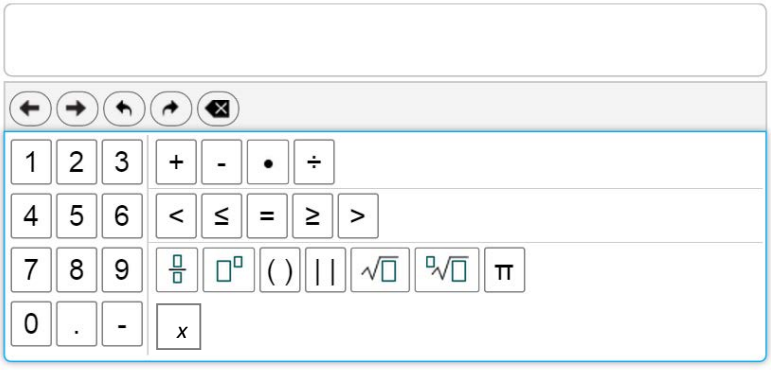
A. Write and solve an equation to find $m\angle PQT$, where $x = m\angle PQT$.



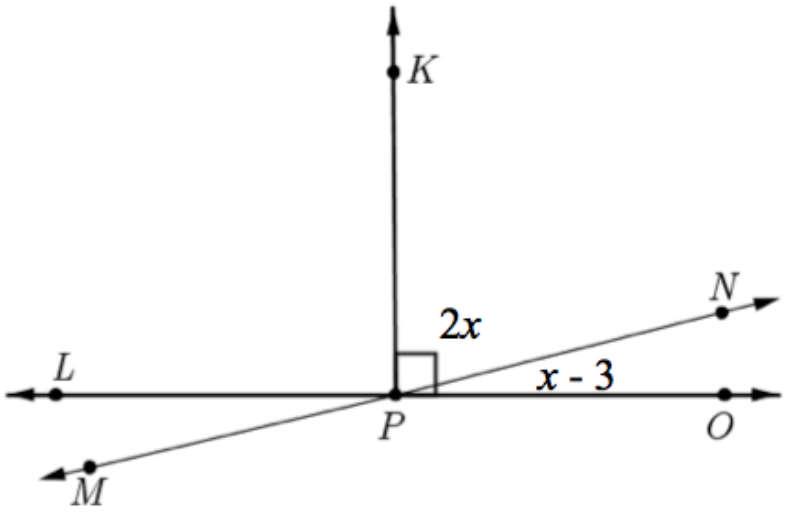
B. Solve your equation.

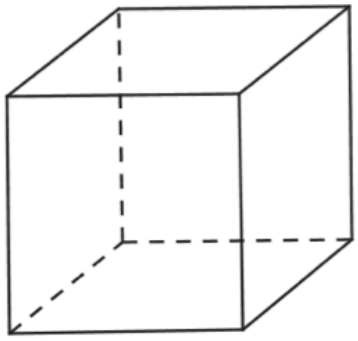
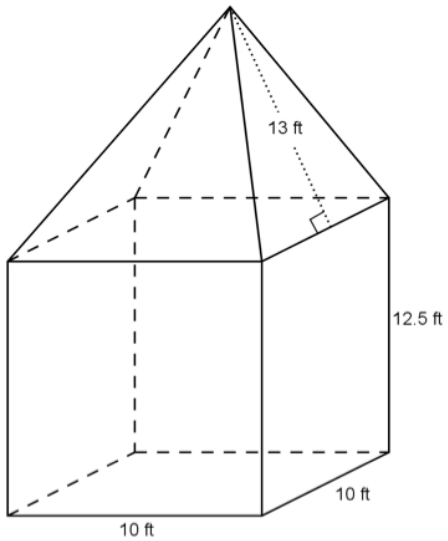
2.

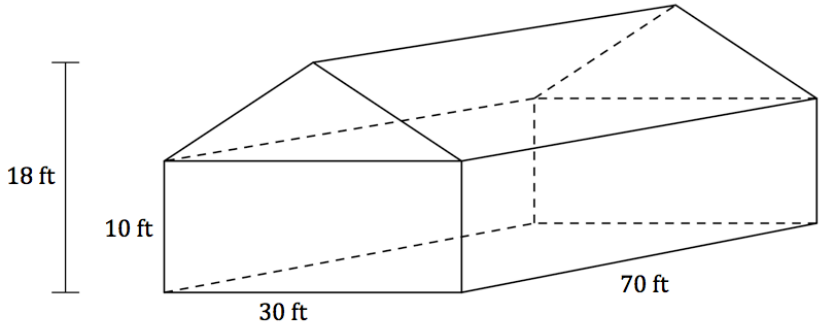
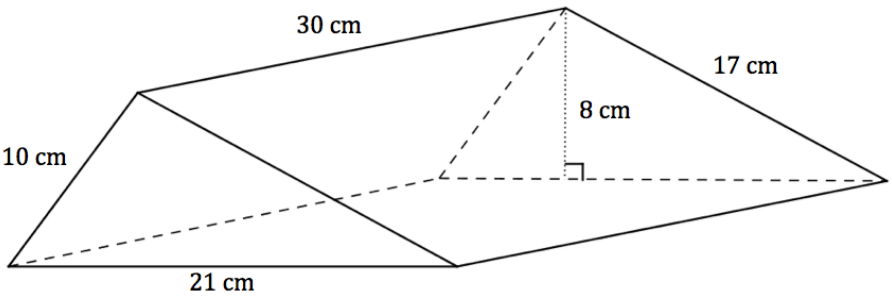
A. Write an equation to find the $m\angle SQT$, where $x = m\angle SQT$.



B. Solve your equation.

3.	 Write and solve an equation to find *x.* Show your work.
4.	What is $m\angle KPN$? Show your work.
5.	What is $m\angle MPL$? Explain how you know. Write your answer in the space provided.

3.	The length of the edge of a cube is 8.2 cm. Label an edge length on the diagram and then find both the surface area and volume of the cube showing all work neatly and completely. Round to the nearest hundredth if necessary. 
4.	The structure shown below will be built for a carnival. The exterior surfaces are going to be painted. What is the total area of the exterior surfaces that need to be painted? Show all work neatly and completely. 

2.	Andrea needs a new air conditioning system for her house. An air conditioner needs to be big enough to cool a house, but it will wear out quickly if it is too big. Calculate the volume of the house pictured below to help Andrea choose the right air conditioner. 
3.	Find the surface area of the right triangular prism. Show all work and explain how you found your answer. 

MAFS.7.SP.1.2-FSA Practice

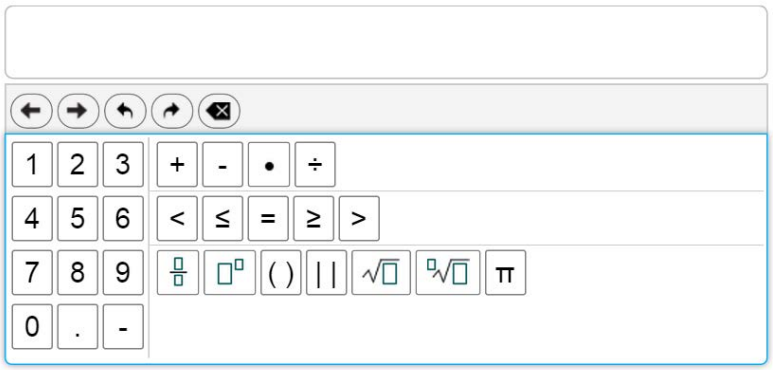
A CALCULATOR IS ALLOWED

1. Mr. Mann, principal at Franklin High School, wondered if the students at his school would prefer longer school days for four days a week or shorter school days for five days a week. The total number of hours spent in school would be the same in either scenario.

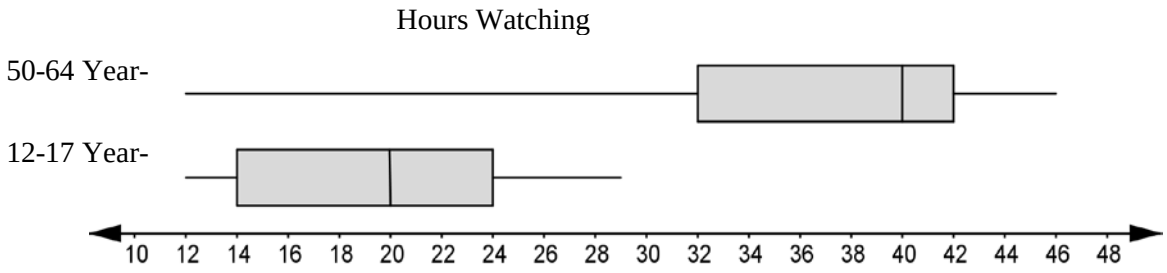
   Out of the 2,600 students enrolled in Franklin High School, Mr. Mann randomly interviewed 50 students from three different grade levels. The results are compiled in the chart below:

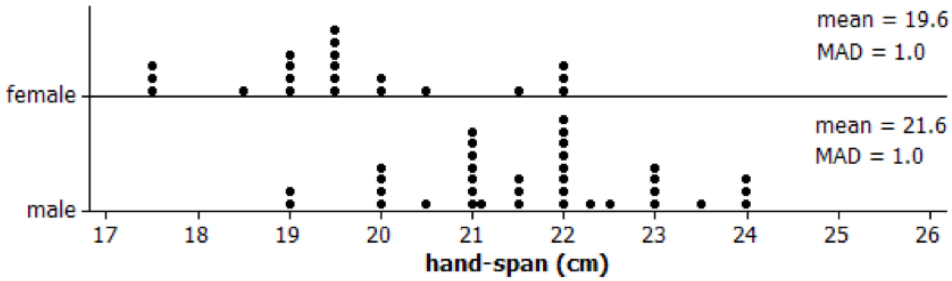
Groups	Longer days, 4 days a week	Shorter days, 5 days a week
10th grade	32	18
11th grade	26	24
12th grade	34	16

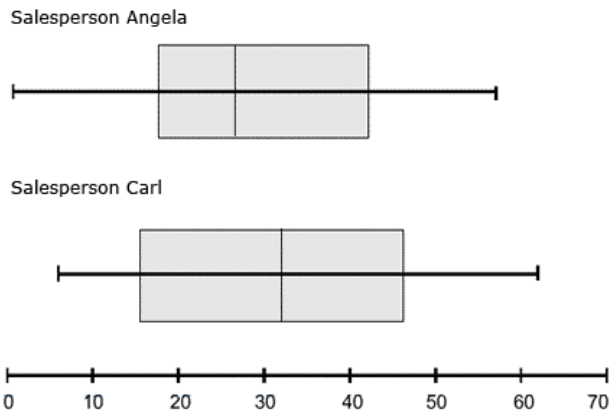
   Estimate the number of students out of the whole school who prefer longer days, four days a week.



2. What might be done to increase the confidence in the estimate for Question 1?

	MAFS.7.SP.2.3	**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Data on the number of hours per week of television viewing was collected on a sample of Americans. The graphs below summarize this data for two age groups.  What is the median number of hours of television viewing per week for each age group? 12-17 age group median _____ 50-64 age group median_____	
2.	What is the interquartile range for each age group? 12-17 age group interquartile range_____ 50-64 age group interquartile range _____	
3.	Describe the difference between the medians as a multiple of the interquartile range.	

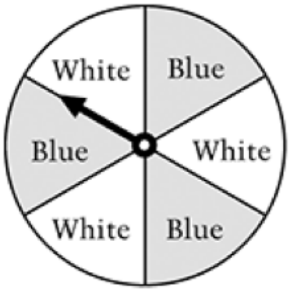
	MAFS.7.SP.2.3-FSA Practice	**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	Students in a random sample of 57 students were asked to measure their hand-spans (distance from outside of thumb to outside of little finger when the hand is stretched out as far as possible). The graphs below show the results for the males and females.  Based on these data, do you think there is a difference between the population mean hand-span for males and the population mean hand-span for females? Justify your answer.	

2.	**The box plots shown compare Angela's vacuum sales to Carl's vacuum sales over a one-month period. Use the box plots shown to answer Questions 2-5.**  Who would you say was a more successful salesperson and why?
3.	What is the *difference* in their median sales?
4.	How much higher was Carl's maximum than Angela's?
5.	Who had a bigger *range* (or variation) in their sales?

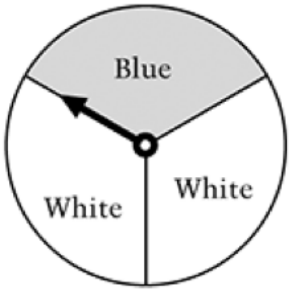
3. In a gumball machine there are 100 red, 75 blue, 50 green, and 125 yellow gumballs. These 350 gumballs are mixed up. Sam puts money in and one gumball comes out. Which color is most likely to come out?

A. Red
B. Blue
C. Green
D. Yellow

4.



Spinner A



Spinner B

Lori has a choice of two spinners. She wants the one that gives her a greater probability of landing on blue.

Which spinner should she choose?

○ Spinner A ○ Spinner B

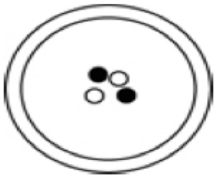
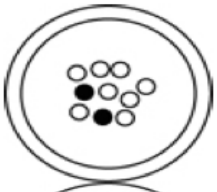
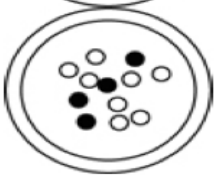
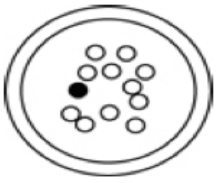
Explain why the spinner you chose gives Lori the greater probability of landing on blue.

5.

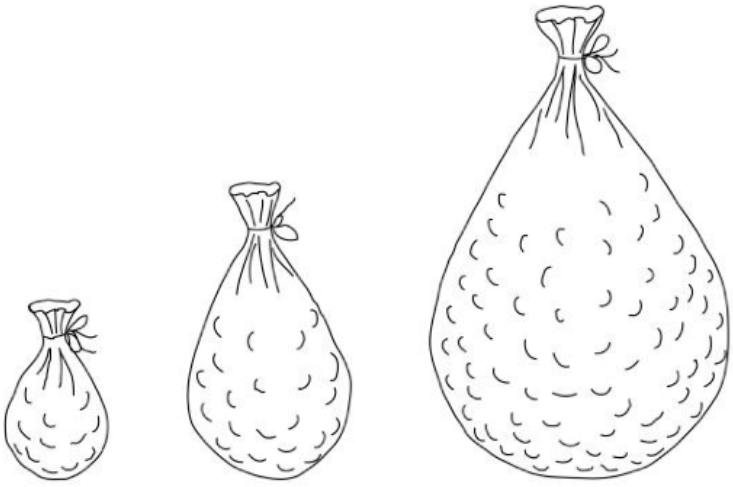
Stickers	Number
Red	|||
Blue	||||
Yellow	||
Green	𝍸 ||

The 16 stickers listed above are placed in a box. If one sticker is drawn from the box, which color is it most likely to be?

A. Red
B. Blue
C. Yellow
D. Green

	MAFS.7.SP.3.5-FSA Practice	**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	In each scenario for Questions 1-3, a probability is given. Describe each event as likely, unlikely, or neither likely nor unlikely. Explain your choice of description. The probability of a hurricane being within 100 miles of a location in two days is 40%.	
2.	The probability of a thunderstorm being located within 5 miles of your house sometime tomorrow is $\frac{9}{10}$.	
3.	The probability of a given baseball player getting at least three hits in the game today is 0.08.	
4.	A person is going to pick one marble without looking. For which dish is there the greatest probability of picking a black marble? A.  B.  C.  D. 	

5. There is only one red marble in each of the bags shown below. Without looking, you are to pick a marble out of one of the bags. Which bag would give you the greatest chance of picking the red marble?



10 marbles 100 marbles 1000 marbles

A. Bag with 10 marbles
B. Bag with 100 marbles
C. Bag with 1000 marbles
D. It makes no difference

	MAFS.7.SP.3.6-FSA Practice	**Neutral-Questions for this standard may or may not allow the use of a calculator.**
1.	A bag contains green marbles and purple marbles. If a marble is randomly selected from the bag, the probability that it is green is 0.6 and the probability that it is purple is 0.4. Dylan draws a marble from the bag, notes its color, and returns it to the bag. He does this 50 times. How many times would you expect Dylan to draw a green marble?	
2.	Is it possible for Dylan to draw a green marble exactly five times? Explain your reasoning.	

4. Mr. Stokes placed five marbles in a bag. He asked a student in his Statistics class to randomly select a marble, note its color, and return it to the bag.

   This trial was repeated 150 times.

Color	Frequency	Probability
blue	29	
yellow	57	
green	34	
red	30	
purple	0	

   The outcomes of the experiment are recorded in the table. Determine the probability of each outcome based on the experiment and enter it in the table.

5. Based on the observed frequencies, does each outcome appear to be equally likely? If not, explain the possible causes of the different probabilities.